

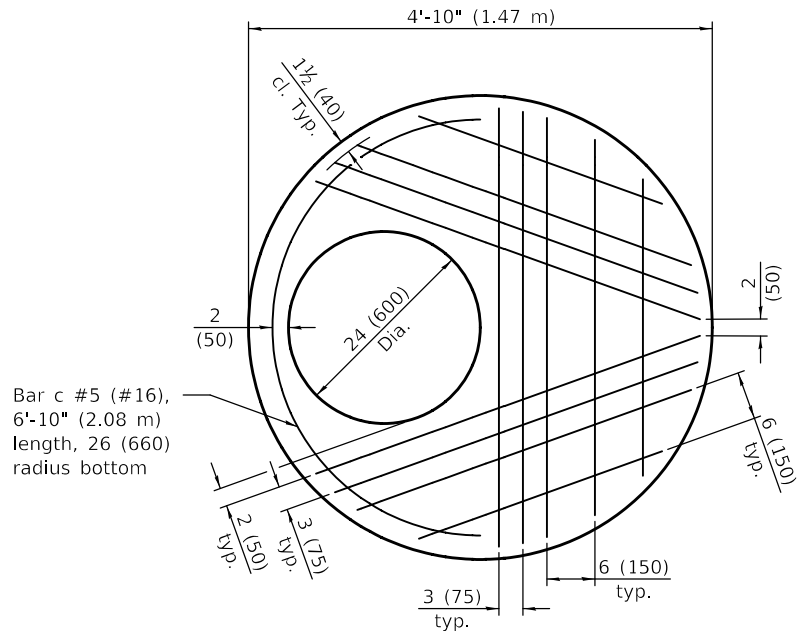
- ## **GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**
1. A minimum of 9 (230) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 24 (600).
 2. A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
 3. A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
 4. Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
 5. The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
 6. Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

GENERAL NOTES

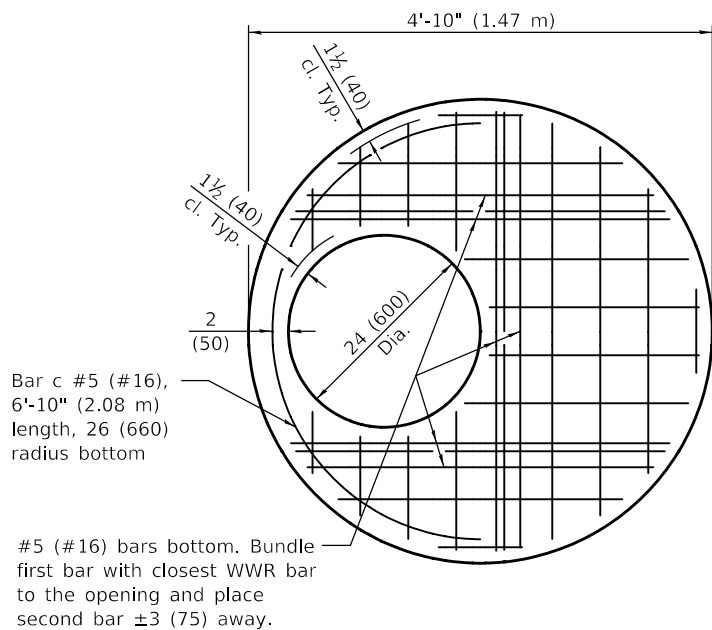
DATE	REVISIONS
3-1-19	Moved wall reinforcement from inside face to middle.
1-1-19	Expanded / refined reinforcement options. Increased manhole depths

PRECAST MANHOLE TYPE A 4' (1.22 m) DIAMETER

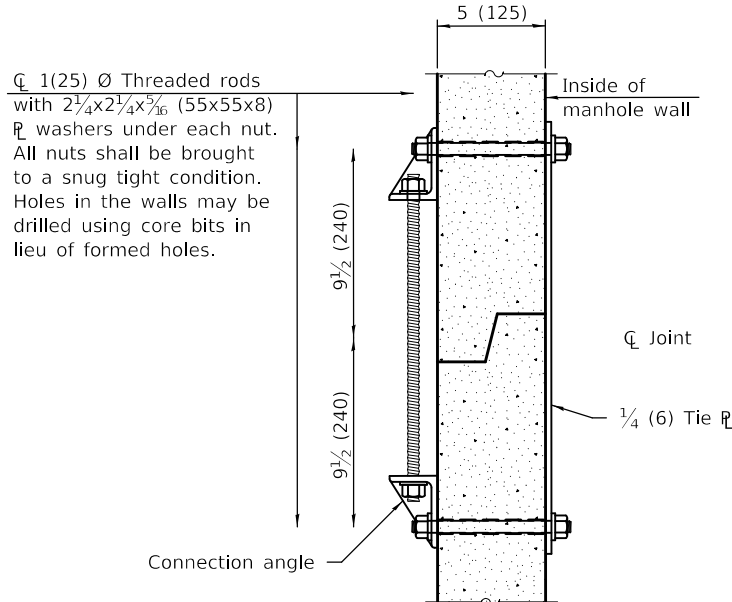
STANDARD 602401-06



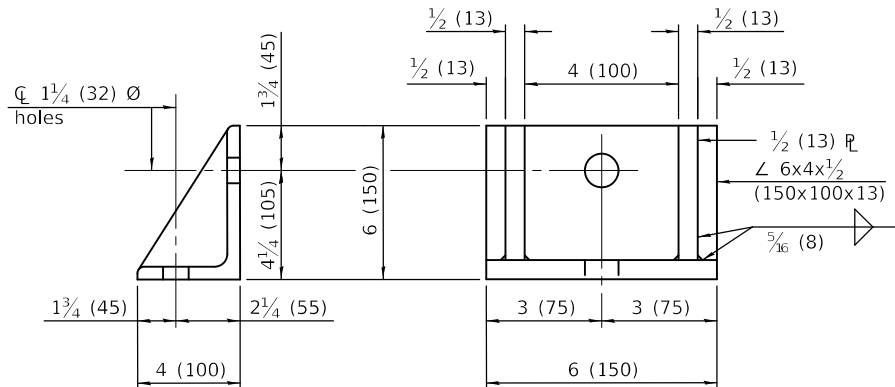
PLAN - FLAT SLAB TOP
(Showing layout of reinforcement bars and c bars)



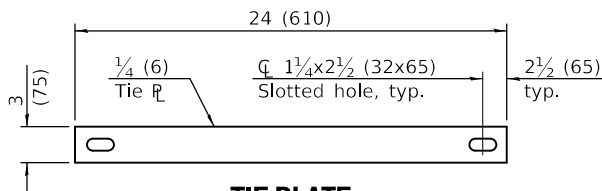
PLAN - FLAT SLAB TOP
(Showing layout of welded wire reinforcement and c bars)



JOINT SPLICE



CONNECTION ANGLE



TIE PLATE

FLAT SLAB TOP REINFORCEMENT

Location	WWR (each direction)		Rebar		
	A _s (min.)	Spacing (max.)	A _s (min.)	Spacing (max.)	Bar Size
Bottom Mat	** 0.62 sq. in./ft. (1312 sq. mm/m)	6 (150)	See plan view for rebar orientation and spacing and this table for bar size		

** Only one layer of WWR permitted to avoid congestion.

WALL REINFORCEMENT

Location	Orientation	WWR or Rebar	
		A _s (min.)	Spacing (max.)
Riser	Circumferential	0.12 sq. in./ft. (254 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)
Barrel	Circumferential	0.12 sq. in./ft. (254 sq. mm/m)	6 (150)
	Vertical	0.16 sq. in./ft. (339 sq. mm/m)	4 (100)

BASE SLAB REINFORCEMENT

Location	Total Height	WWR or Rebar (each direction)	
		A _s (min.)	Spacing (max.)
Top Mat	≤ 20 ft. (6.10 m)	0.24 sq. in./ft. (508 sq. mm/m)	10 (250)
	> 20 ft. (6.10 m)	0.24 sq. in./ft. (508 sq. mm/m)	10 (250)